Session 407

Customizing QuickTime and Darwin Streaming Server

Chris LeCroy
QuickTime Streaming Server Engineering

What You'll Learn

- How to customize:
  - Using the server module API
  - Using the admin protocol
  - Extending the web-based admin

Status

- QTSS 3.0 available now!
  - Download from web for Mac OS X
  - Included with Mac OS X Server
  - Darwin download (binary and source)
  - Darwin CVS repository (source)

Module APIs

Steve Ussery
QuickTime Streaming Server Engineering

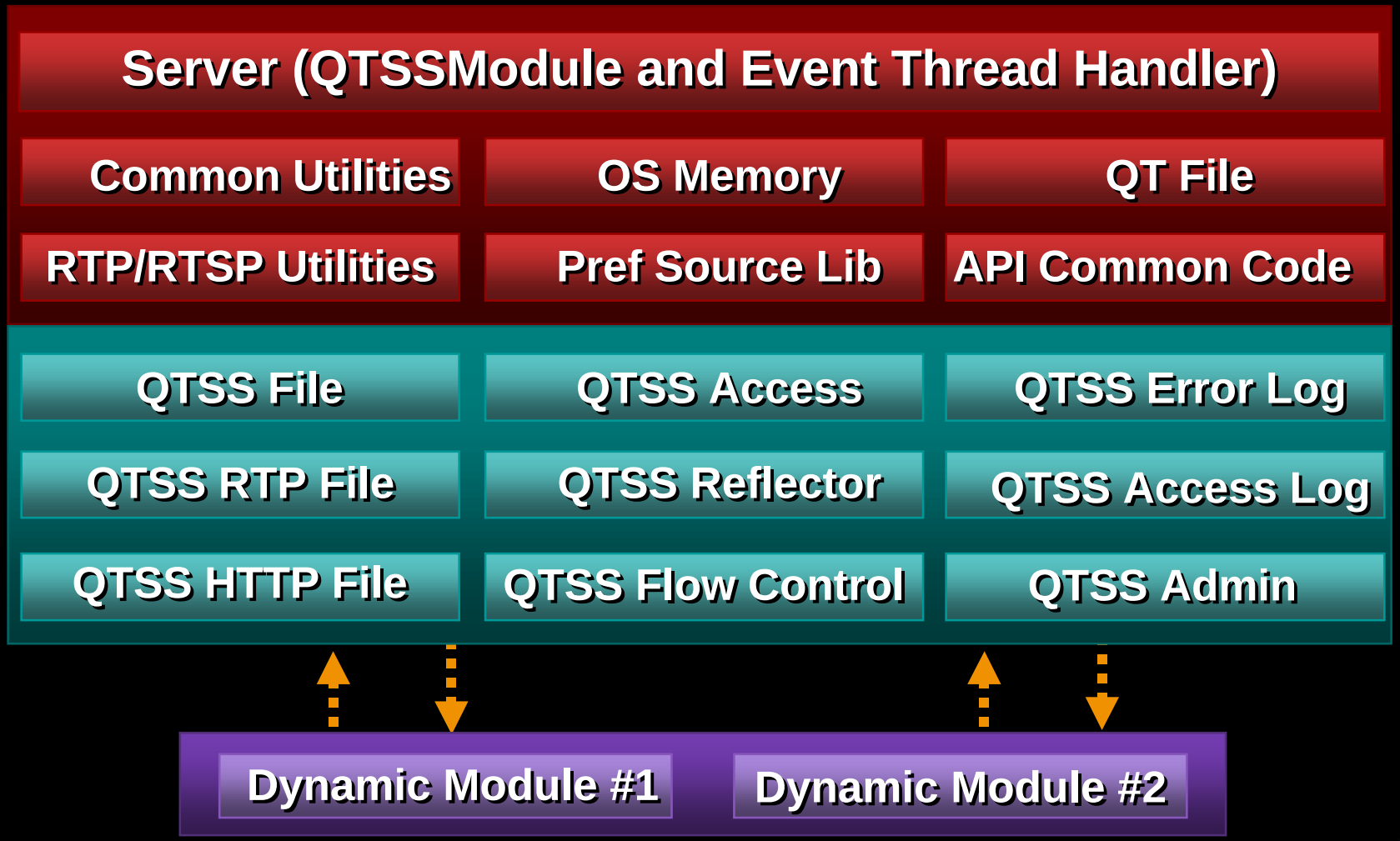
QTSS 3.0 API Overview

- Module Architecture
- New API for QTSS 3.0
- Source Code Example
- Demo of example

Module Architecture

- Architecture is loosely based on the Apache Module architecture
- Static vs. Dynamic modules
- API and Module roles
- QTSS features are implemented as Modules

Module Architecture



Module Roles

- Register Role
- Initialize and Shutdown Roles
- Reread Preferences Roles
- Error Log Role
- RTP Roles

Module Roles (Cont.)

- RTSP Roles
  - RTSP Filter/Route Roles
  - RTSP Authorize Role
  - RTSP Pre/Postprocessor Roles
  - RTSP Request Role

New Module API Roles

- File System Module Roles
  - Open File Preprocess Role
  - Open/Close File Role
  - Read/Write File Role
  - Request Event File Role

Module Main Routine

- Every module must have a main routine that specifies the Dispatch function

```
QTSS_Error
QTSSErrorMailModule_Main(void* inPrivateArgs)
{
    return _stublibrary_main(inPrivateArgs,
                             QTSSErrorMailModuleDispatch);
}
```

Dispatch Function

```
QTSS_Error
QTSSErrorMailModuleDispatch(
                                QTSS_Role inRole,
                                QTSS_RoleParamPtr inParamBlock)
{
    switch (inRole) {
        case QTSS_Register_Role:
            return Register(&inParamBlock->regParams);
        case QTSS_ErrorLog_Role:
            return HandleError(&inParamBlock->errorParams);
        // … other roles we handle here ...
    }
    return QTSS_NoErr;
}
```

Register Role

- The register role for a module is required

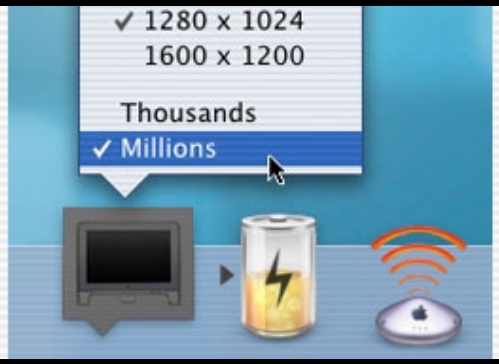
```
QTSS_Error
Register(QTSS_Register_Params* inParams)
{
    (void)QTSS_AddRole(QTSS_Initialize_Role);
    (void)QTSS_AddRole(QTSS_Shutdown_Role);
    (void)QTSS_AddRole(QTSS_ErrorLog_Role);
    return QTSS_NoErr;
}
```

Error Log Role

- The example Error Log Role is handled by:

```
QTSS_Error
HandleError(QTSS_ErrorLog_Params* inParams)
{
    char *bp = inParams->inBuffer;
    if (bp != NULL)
        MySendMail(smtpHost, bp);
    return QTSS_NoErr;
}
```

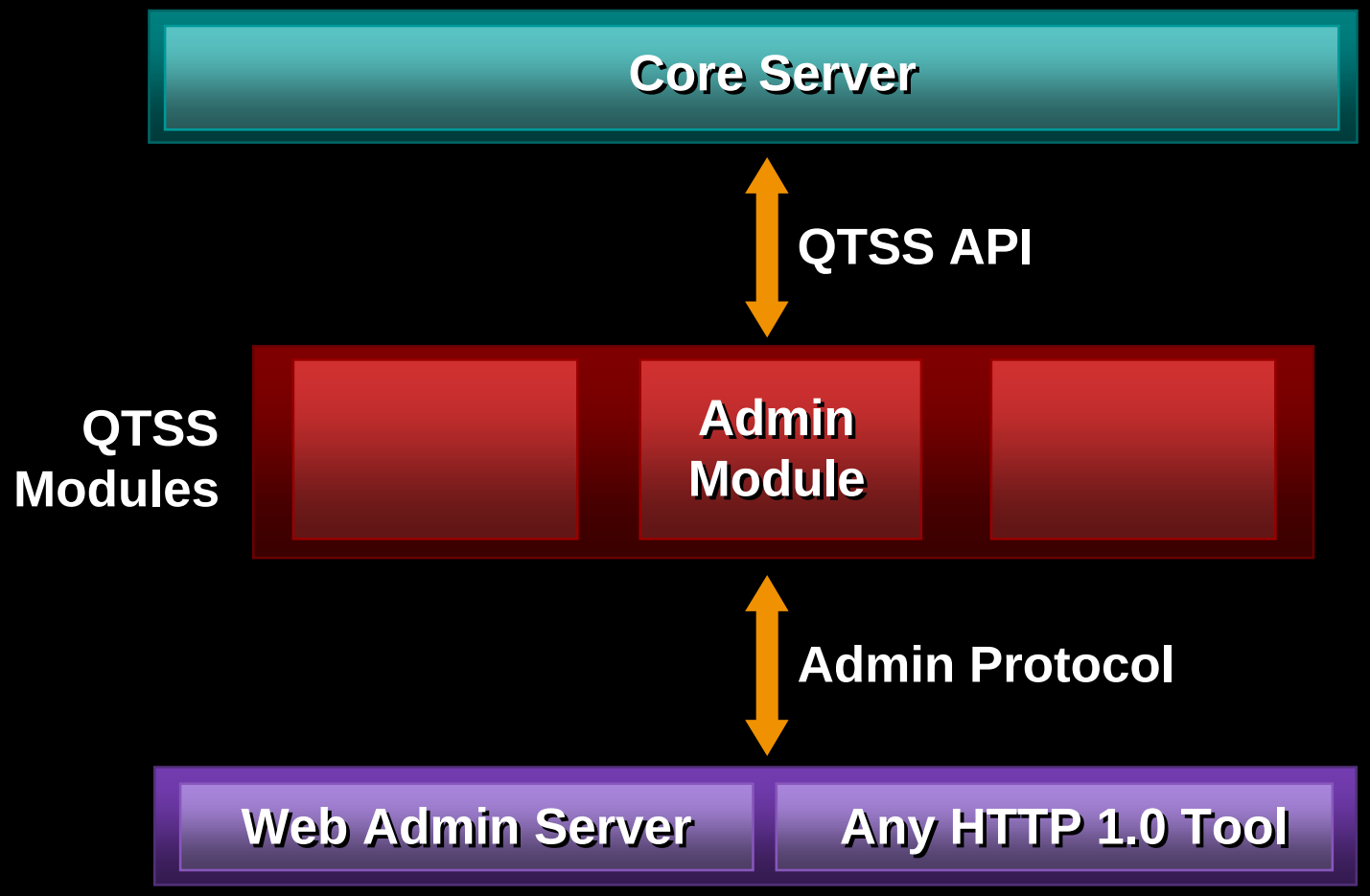
Demo



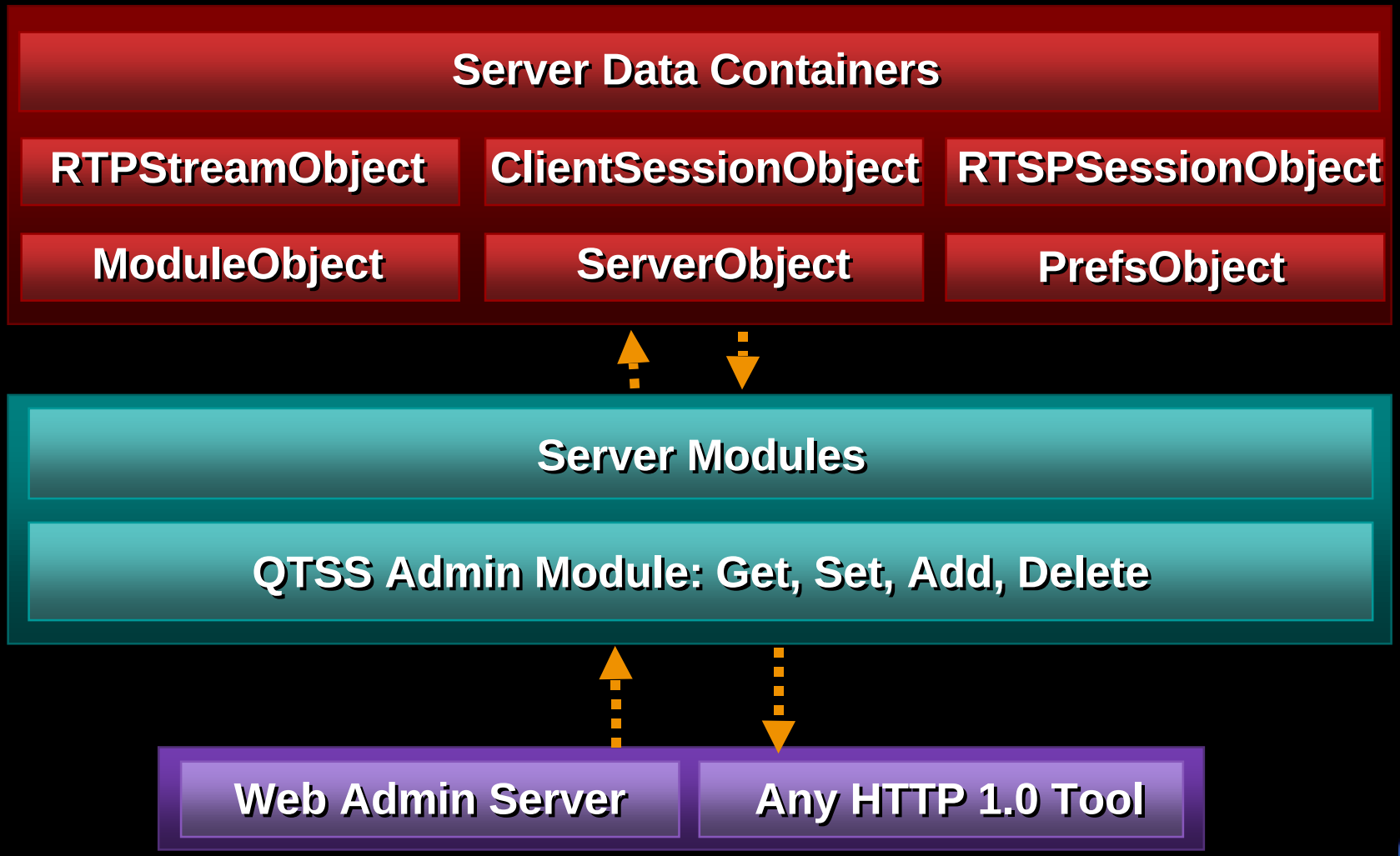
Admin Protocol

John Murata
QuickTime Streaming Server Engineering

QTSS Architecture



QTSS Data Access



Data Hierarchy

/modules/admin/server/

qtssSvrRTSPPorts/
qtssSvrHandledMethods/
qtssSvrModuleObjects/
qtssSvrPreferences/
qtssSvrMessages/
qtssSvrClientSessions/

1/
qtssCliSesStreamObjects/
qtssCliSesLastRTSPSession/

2/
qtssCliSesStreamObjects/
qtssCliSesLastRTSPSession/

3/
qtssCliSesStreamObjects/
qtssCliSesLastRTSPSession/

Protocol

GET /modules/admin/server/*?command=get HTTP/1.0

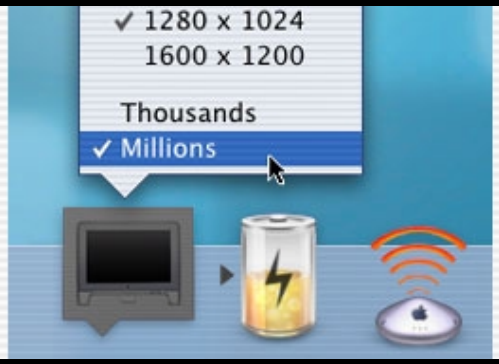
```
HTTP/1.0 200 OK
Server: QTSS/3.0 [v315]-MacOSX
Connection: Close
Content-Type: text/plain

Container="/admin/server/"
qtssSvrDefaultDNSName="murata1.apple.com"
qtssRTSPSvrServerVersion="3.0 [v315]"
qtssRTSPSvrServerBuildDate="Apr 12 2001, 19:38:03"
qtssRTPSvrCurConn="0"
qtssRTPSvrTotalConn="4"
qtssRTPSvrCurBandwidth="0"
qtssRTPSvrTotalBytes="27146096"
qtssRTPSvrAvgBandwidth="0"
qtssSvrModuleObjects/
qtssSvrPreferences/
qtssSvrMessages/
qtssSvrClientSessions/
error:(0)
```

More Info

Download the Darwin Streaming Server Source
Look in the Documentation Directory
admin-protocol-README.txt

Demo



Web Admin

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Overview

- QTSS and Web-based Administration architecture
- How does the Web Admin work?
- Example of Special Tags
- Demo

Web-based Admin

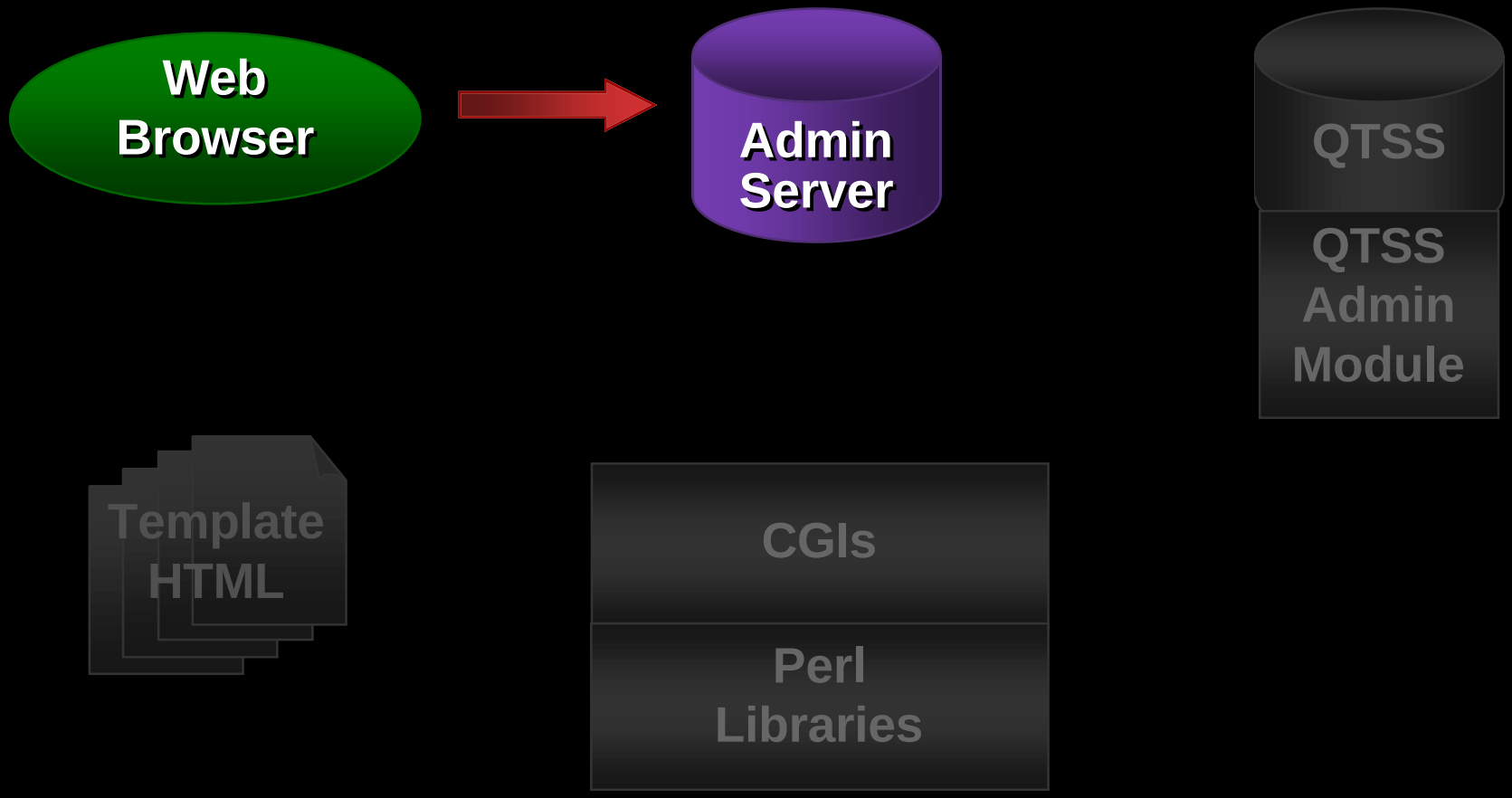
- Based on the Admin protocol
- QTSS API attributes
- Web Server, CGI scripts, Server Side Includes, Perl
- CGIs handle all HTTP response headers
- Authentication provided by QTSS

Why Customize the Web Admin?

To be able to:

- Modify advanced server preferences
- Configure module preferences
- Add advanced monitoring capabilities

How Does the Web-based Admin Work?



HTTP GET /parse.cgi?status/status_snapshot.htm

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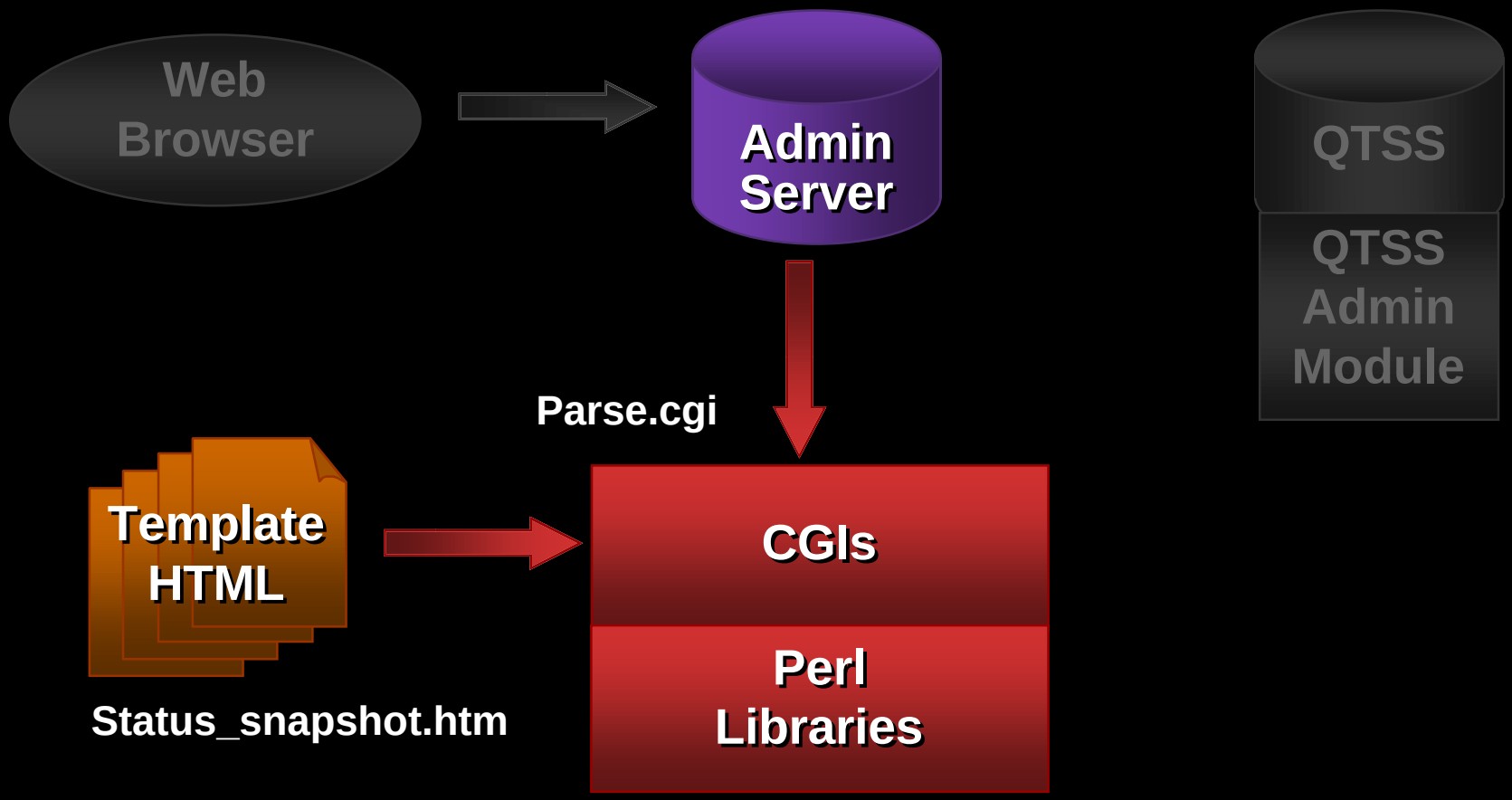

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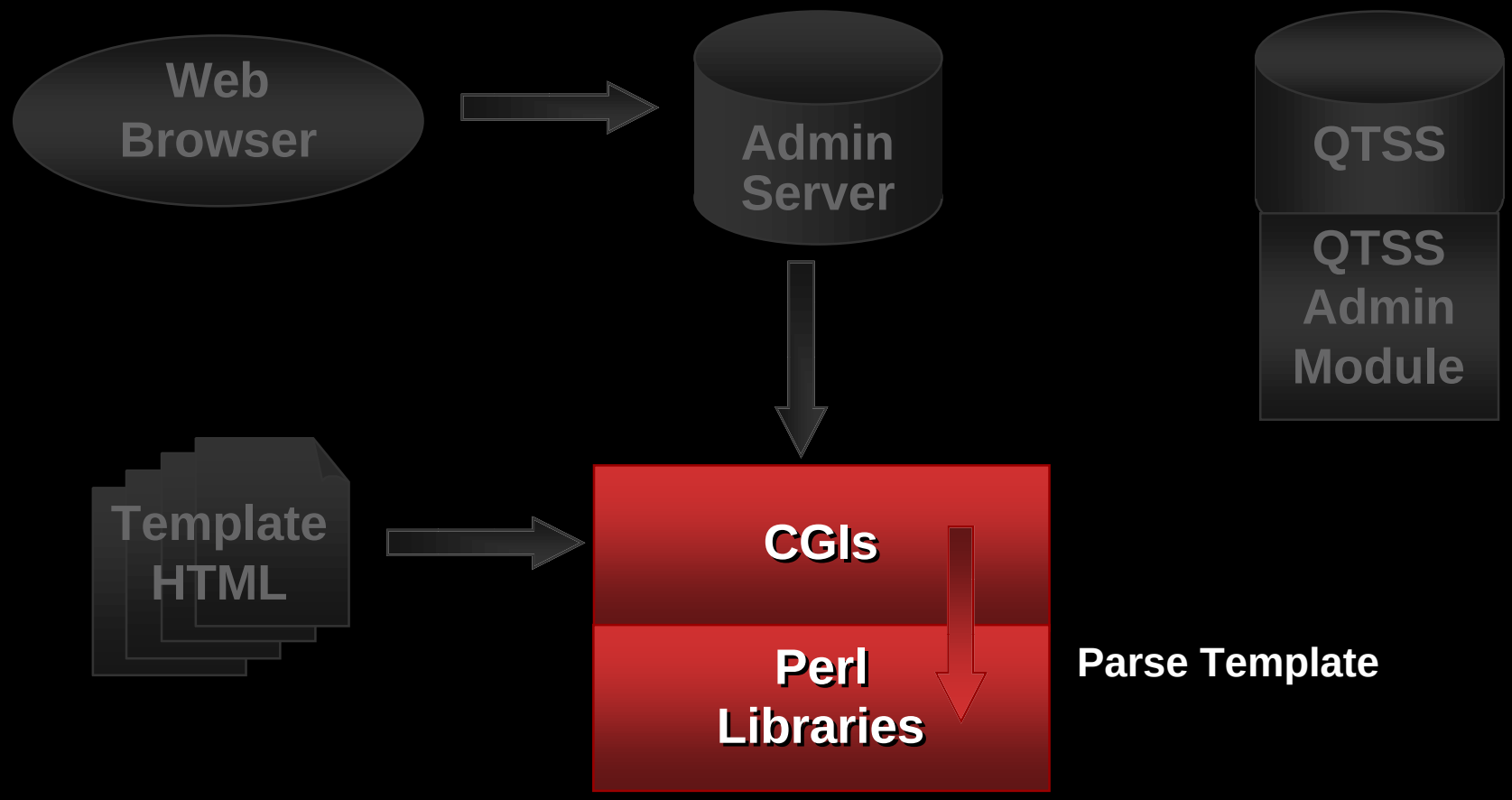

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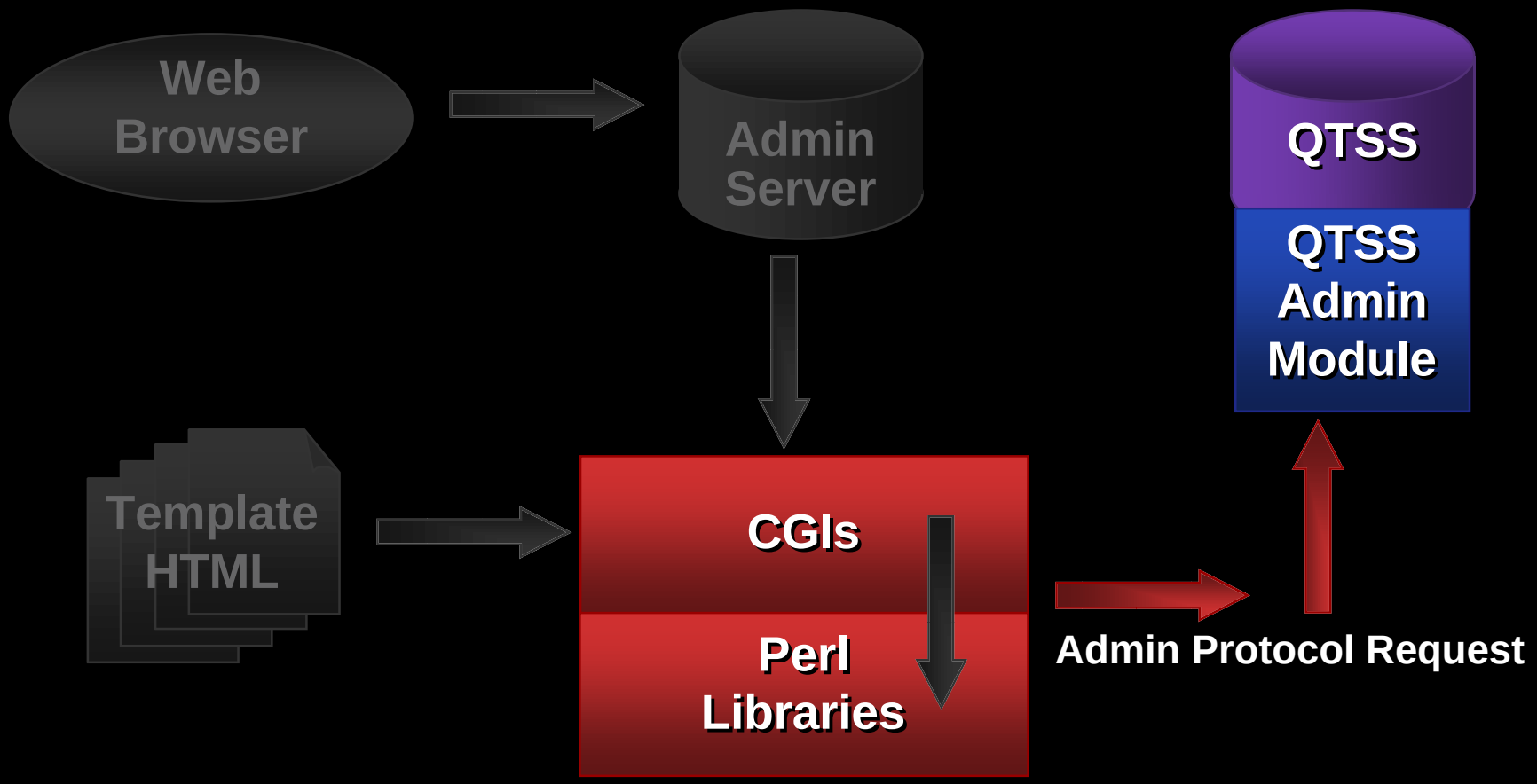

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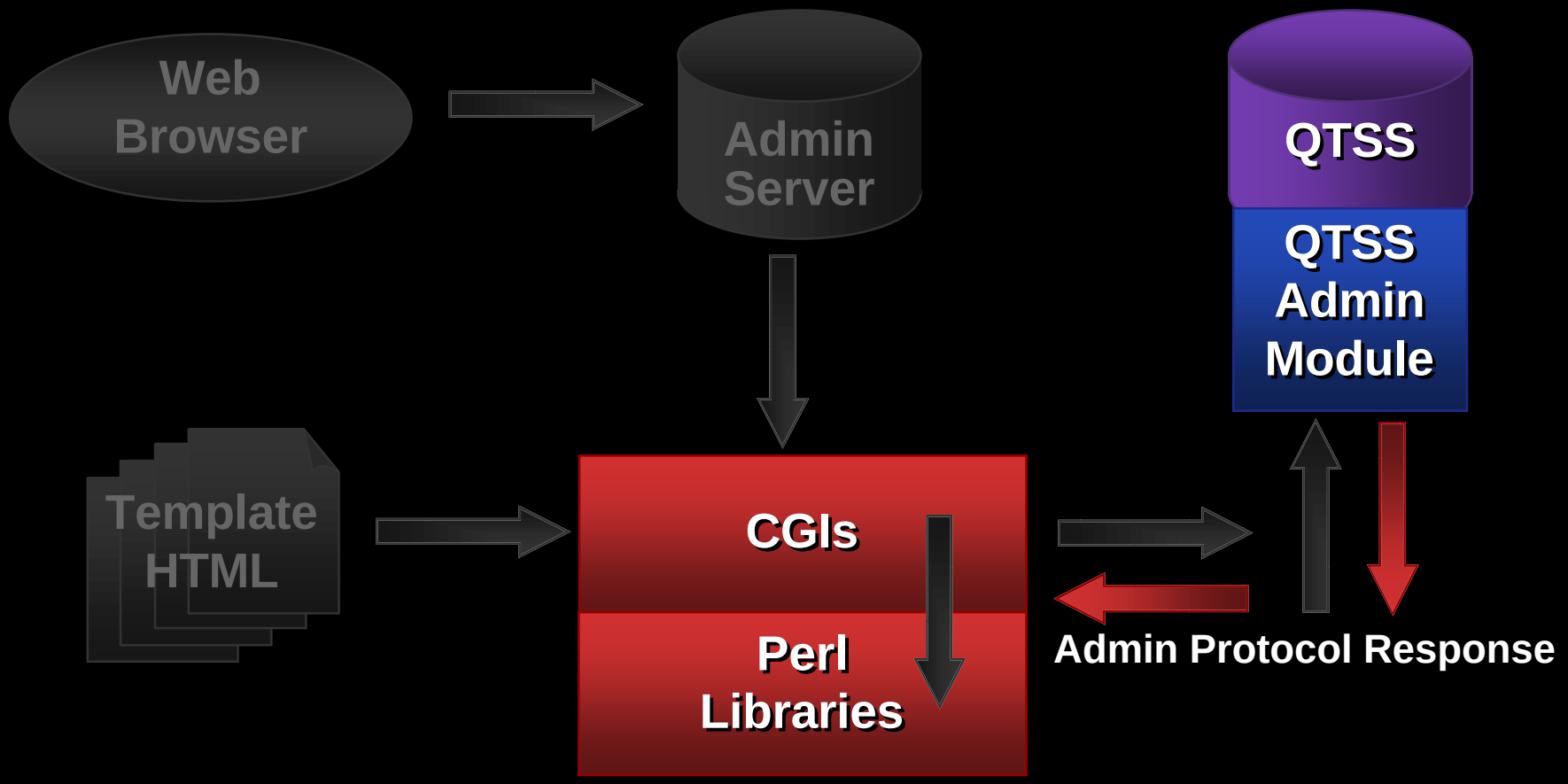

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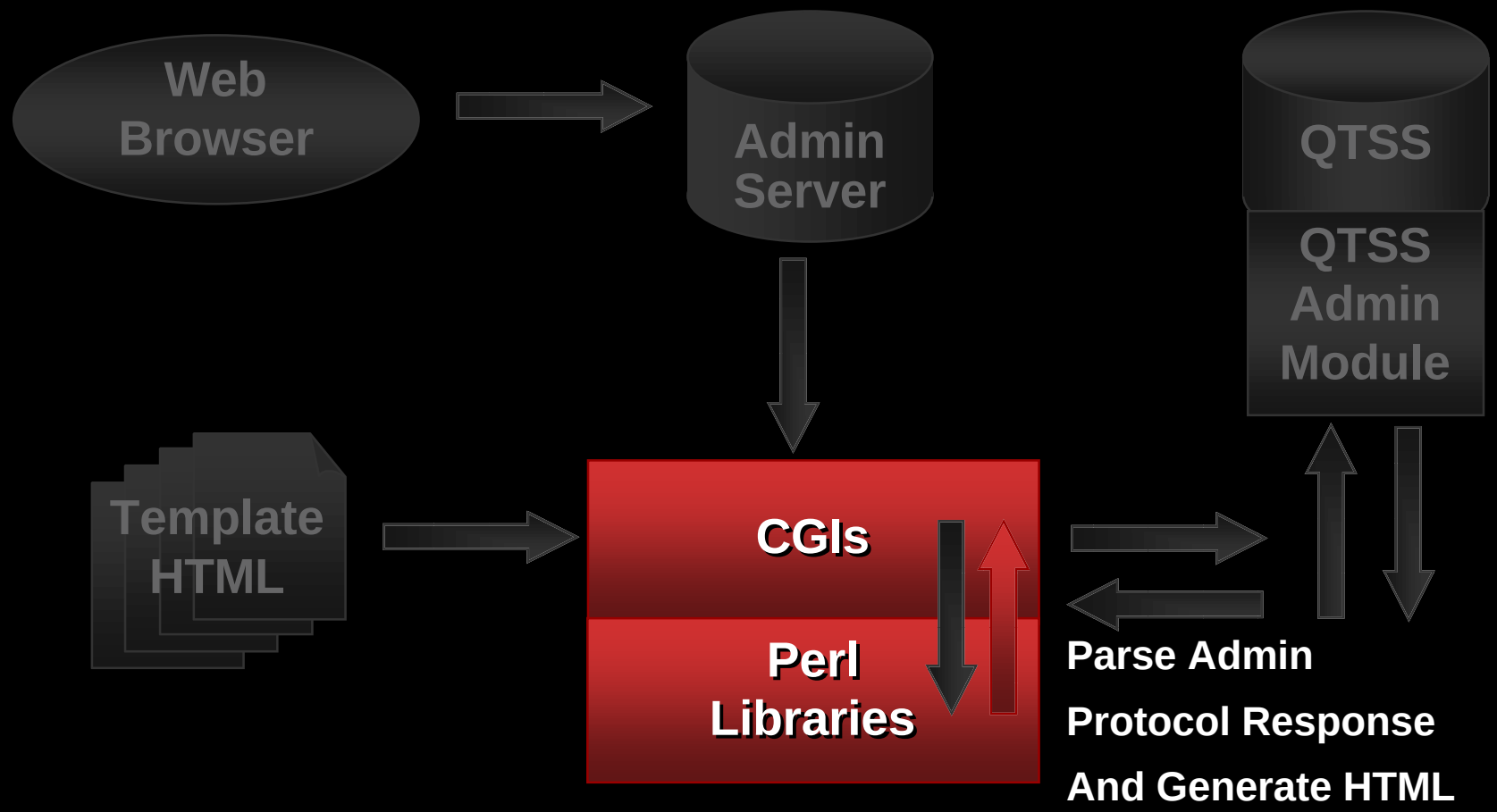

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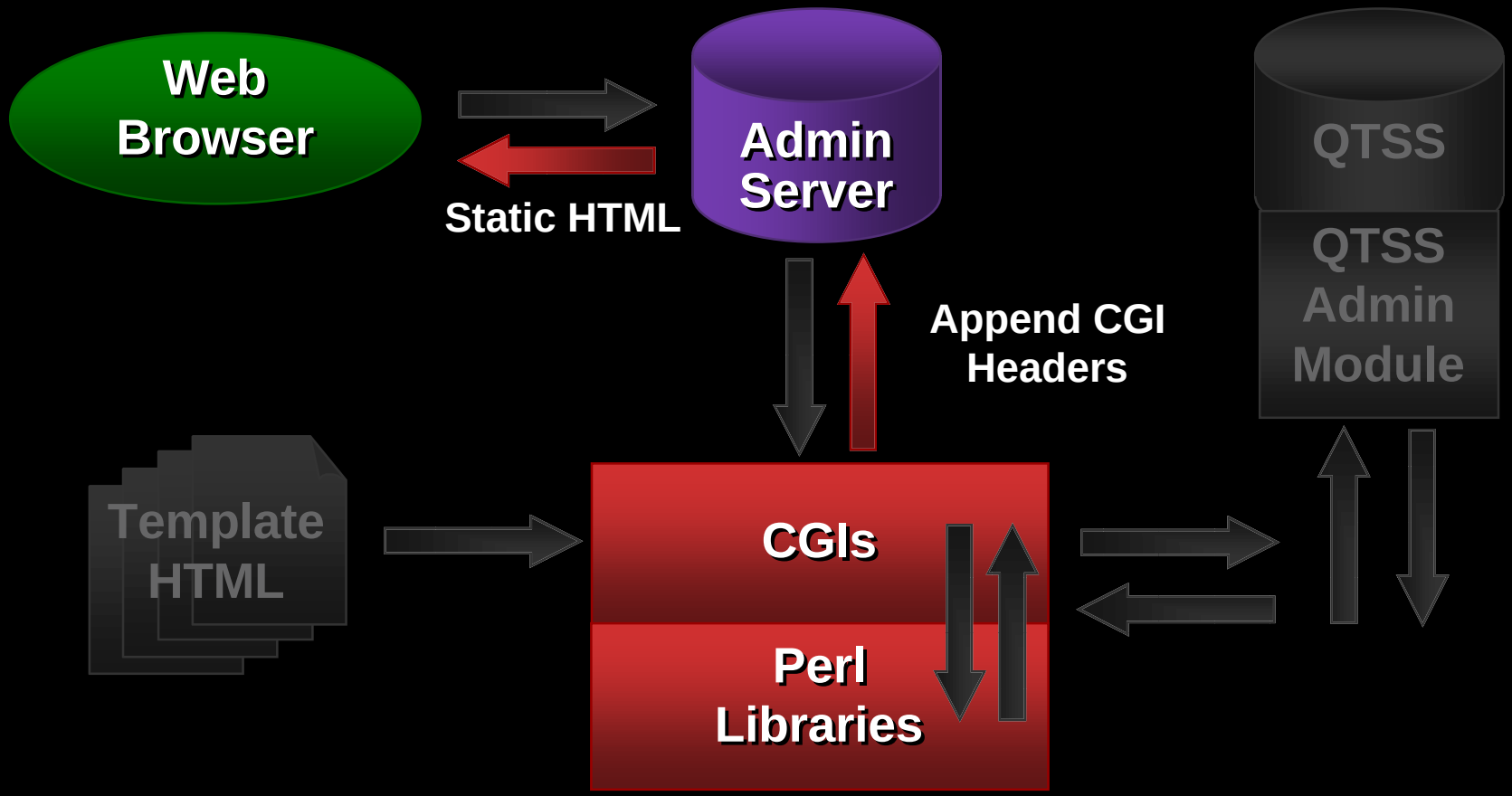


HTTP GET /parse.cgi?status/status_snapshot.htm

Example of Special Tags

- **ECHODATA**
- Usage: <%%**ECHODATA** parameter%%>
- Tag found in HTML template

```
<%%ECHODATA
/server/qtssSvrDefaultDNSName%%>
```

Special Tags (Cont.)

- Admin Protocol Request

  HTTP GET /modules/admin/server/qtssSvrDefaultDNSName

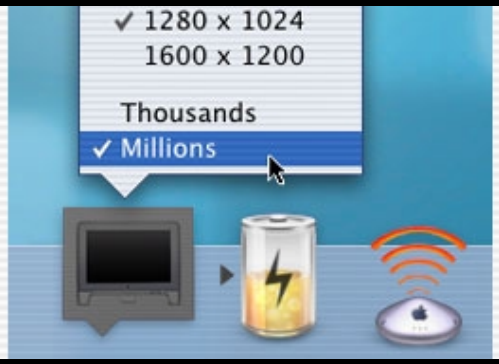
- Admin Protocol Response

  Container="/admin/server/"
  qtssSvrDefaultDNSName="foo.bar.com"
  error: (0)

- Tag in generated HTML replaced by

  foo.bar.com

Demo



Development Opportunities

- Modify the source code directly
- Write a module
- Extend the U/I
- Write a monitoring tool
- Implement the caching protocol

For More Information

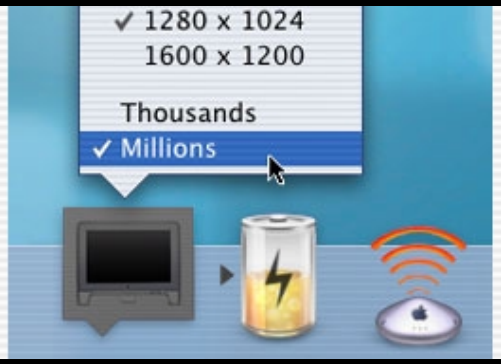
- "Streaming-server-developers" mailing list
  http://lists.apple.com
- Apple Open Source Projects
  http://www.opensource.apple.com
- QuickTime
  http://developer.apple.com/quicktime/

Roadmap

FF109 Feedback Forum: QuickTime

Room J1
Thurs., 3:30pm

Q&A



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jefflowe@apple.com

http://developer.apple.com/events/urls.html

ANNOUNCING

QuickTime Live!

October 8–11, 2001

The Beverly Hilton Hotel

Beverly Hills, CA

Full day workshops, Conference Sessions,
QuickTime Product Showcase, Keynotes and Social Events with the community
of QuickTime Developers, Content Creators, and New Media Business Professionals.
Get Face-to-Face with the QuickTime team for a week of training, business
Opportunities and industry perspectives that you can't get anywhere else.

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Worldwide Developers Conference 2001